

## NEW SPECIES OF PASPALUM

Jason R. Swallen

### Ceresia

#### 1. PASPALUM SPISSUM Swallen, sp. nov.

Culmi erecti, 50-60 cm. alti; laminae erectae, appressae, 6-8 cm. longae, 2-3 mm. latae, prominente papilloso-hispidae; spiculae 4.2 mm. longae; gluma secunda longipilosa; lemma sterile marginibus ciliatum; fructus 3.4 mm. longus, pallidus, summo ciliatus.

Perennial; culms stiffly erect, 50-60 cm. tall; cataphylls conspicuously appressed-villous; sheaths all longer than the internodes, about 15 completely covering the culm, glabrous; blades erect, appressed, 6-8 cm. long, 2-3 mm. wide, acuminate, prominently papillose-hispid; racemes 1 or 2, when 2, one a short distance below the other, 1 mm. wide with narrow margins; spikelets 4.2 mm. long, the second glume pilose with long hairs on the lower part of the back, a few hairs extending on the margins to the summit, the sterile lemma appressed-pilose on the lower part of the back, the margins ciliate on the upper half; fruit 3.4 mm. long, pale, the lemma rounded, ciliate at the summit.

Type in the U. S. National Herbarium, No. 1612651, collected among rocks at top of rocky hill, Carolina to San Antonio de Balsas, Maranhão, Brazil, March 20-25, 1934, by Jason R. Swallen (No. 4050). Also collected approximately in the same locality (Swallen 4077, 4078), and from Grajahú to Porto Franco, Maranhão (Swallen 3796).

Paspalum spissum is related to P. carinatum Humb. & Bonpl., but differs greatly in having flat appressed blades completely covering the culm, conspicuously villous cataphylls, and very narrow margins on the racemes. In P. carinatum the blades are involute, crowded toward the base of the plant, the lowermost sheaths are scarcely pilose, and the margins of the racemes are broad. There is little difference in the spikelets, although those of P. carinatum average slightly larger.

### Notata

#### 2. PASPALUM NITIDUM Swallen, sp. nov.

Culmi caespitosi, 8-14 cm. alti; laminae 1.7-4 cm. longae, 2-3 mm. latae, pilosae; racemi 2, sub-conjugati, rhachi glabri; spiculae 1.5 mm. longae,



glabrae, ellipticae vel obovatae; fructus pallidus, gluma secunda et lemmate sterile brevior.

Perennial; culms densely tufted, erect, 8-14 cm. tall; lower sheaths densely appressed or spreading pilose, the upper sparsely pilose or nearly glabrous; ligule membranaceous about 0.5 mm. long; blades 1.7-4 cm. long, 2-3 mm., or rarely 4 mm. wide, densely pilose on both surfaces; racemes 2, subconjugate, 1-2 cm. long, the rachis glabrous, even on the margins; spikelets 1.5 mm. long, smooth, shining, elliptic, or slightly obovate, the tip rounded or sometimes minutely pointed; fruit pale, somewhat shorter than the second glume and sterile lemma.

Type in the U. S. National Herbarium, No. 2383777, collected on campo at Monte Crista, Garuva, São Francisco do Sul, Santa Catarina, Brazil, March 3, 1961, by R. Reitz & R. Klein (No. 10900). Also collected by Reitz & Klein at Barra do Sul, Araquari (No. 520).

This species is the small member of the Notata group, perhaps more closely related to P. pumillum Nees than anything else. It differs, however, in having smaller spikelets and densely pilose foliage.

#### Livida

Plants annual.

Racemes 4-7, 2-2.5 cm. long, the rachis 0.5 mm. wide, glabrous, the margins scabrous; spikelets 1.6-1.7 mm. long, the tip rounded.

#### 3. P. pisinum

Racemes 5-19, usually more than 10, the rachis 0.8 mm. wide, pubescent or scabrous on the surface, with long hairs on the margins; spikelets 1.9-2 mm. long, very scabrous, apiculate.

#### 4. P. trinii

Plants perennial.

Lowermost sheaths densely pilose toward the base.

Culms very slender; racemes 3-10, appressed, 1-2 cm. long, on a flexuous axis; axils of the racemes glabrous; spikelets 1.8-2 mm. long, apiculate; blades subfiliform.

#### 5. P. trichophyllum

Culms stouter; racemes mostly 10-20, ascending to spreading, the lower up to 5 cm. long, long-pilose in the axils; spikelets 2-2.2 mm. long, rounded at the tip.....

#### 6. P. goeldii

Lowermost sheaths glabrous or nearly so toward the base.

Spikelets 2.3-2.5 mm. long; culms decumbent-spreading, often rooting at the lower nodes; racemes relatively distant, spreading, the rachis 1.5-2 mm. wide, usually without long hairs.

#### 7. P. denticulatum



Spikelets 1.4 mm. long; culms erect or geniculate at the lower nodes; racemes crowded, appressed, the rachis 0.5 mm. wide, long-ciliate.

8. P. humigenum

3. PASPALUM PISINNUM Swallen, sp. nov.

Culmi erecti, 15-27 cm. alti, glabri; laminae planae, 5-10 cm. longae, 2-3 mm. latae, scabrae; racemi 4-7, anguste adscendentes, 2-2.5 cm. longi; spiculae solitariae, 1.6-1.7 mm. longae, obovatae; fructus pallidus, minute striatus.

Annual; culms erect or ascending, 15-27 cm. tall, more or less geniculate at the nodes, glabrous; sheaths shorter than the internodes, glabrous, the uppermost glabrous; ligule 3 mm. long, whitish, somewhat decurrent; blades flat, lax, 5-10 cm. long, 2-3 mm. wide, acuminate, scabrous-roughened on both surfaces, the midnerves and margins scabrous, with a few long hairs near the base; inflorescence 3-4 cm. long, composed of 4-7 appressed or narrowly ascending racemes 2-2.5 cm. long, the rachis 0.5 mm. wide, glabrous, the margins scabrous; spikelets solitary, pale, 1.6-1.7 mm. long, broad and rounded at the summit, slightly obovate; second glume and sterile lemma thin, 3-nerved, the green nerves contrasting with the pale body, the lateral nerves conspicuously scabrous; fruit pale, minutely striate.

Type in the U. S. National Herbarium, No. 1613175, collected in wet open ground near swamp, Fazenda Nacional to Picos, Piaui, Brazil, April 4-5, 1934, by Jason R. Swallen (No. 4217).

4. PASPALUM TRINII Swallen, sp. nov.

Culmi 90 cm. alti, erecti, ramosi, glabri; vaginae sparse longipilosae; laminae planae, 17-28 cm. longae, 3-4 mm. latae, acuminatae, sparse longipilosae; racemi 10-12, appressi, usque 3.5 cm. longi; spiculae 1.9-2 mm. longae, obovatae, apiculatae, marginibus scabrosae; fructus pallidus late acutus.

Annual; culms about 90 cm. tall, erect, branching at the lower nodes, glabrous, or the nodes sparsely pilose; sheaths elongate, densely scabrous-roughened and sparsely pilose with long hairs; ligule 2.5-3 mm. long, membranaceous, decurrent; blades flat, 17-28 cm. long, 3-4 mm. wide, acuminate, densely scabrous-roughened like the sheaths and sparsely pilose with long hairs; inflorescences about 10 cm. long, composed of 10-12 appressed or narrowly ascending racemes, the lowermost as much as 3.5 cm. long, the rachis 0.8 mm. wide, scaberulous or pubescent on the surface, the margins very scabrous, and with a few long hairs; spikelets 1.9-2 mm. long, oblong or slightly obovate, apiculate, usually tinged with purple; second glume and



sterile lemma scabrous, 3-nerved, the marginal nerves conspicuously scabrous; fruit pale, broadly acute.

Type in the U. S. National Herbarium, No. 1613382, collected in muddy pond, Cratheús, Ceará, Brazil, May 9-10, 1934, by Jason R. Swallen (No. 4507).

British Guiana: Rupununi Savanna, Melville (Herbarium No. 162). Brazil: Ceará: Junco to Quixada, Swallen 4463; Cratheús, Swallen 4510. Piauí: Picos, Swallen 4225; Fazenda Nacional, Swallen 4201. Maranhão: Caxias to Barra do Corda, Swallen 3524. Bahia: Joazeiro, Dorsett & Popenoe 406b.

5. *PASPALUM TRICHOPHYLLUM* Henr. Blumea 4: 513. 1941.

Brazil: Pará: Ilha Marajó, Kuhlman 2135; Black & Engelhard 50-8984, 50-8985; Soure, Black 50-8844; Black & Lobato 50-9304; Fazenda Tuiuiú, Rio Ararí, Black, Ledoux & Stegemann 52-14255; Fazenda Camburupy, Swallen 4940; Fazenda Gavinho, Goeldi 165 (type). Ilha Mexicana: Santa Maria, Huber 2400.

6. *PASPALUM GOELDII* Swallen, sp. nov.

Culmi erecti vel decumbentes, 65 cm. alti, glabri; laminae ca. 25 cm. longae, 3-4 mm. latae, erectae vel patentés, glabrae; racemi 20, adscendentes, usque 5 cm. longi; spiculae 2-2.2 mm. longae, ellipticae, dense pubescentes; fructus pallidus, striatus.

Perennial; culms erect or decumbent at the base, 65 cm. high, glabrous; sheaths all longer than the internodes, the lowermost densely pilose at the base, otherwise glabrous; ligule 5 mm. long, brown; blades about 25 cm. long, 3-4 mm. wide, erect to spreading, glabrous or nearly so on the surface, the margins scabrous; inflorescence 14 cm. long, the axis densely pubescent with scabrous margins, composed of 20 ascending racemes, the lowermost 5 cm. long; rachis with long hairs in the axils, 0.8-1 mm. wide, pubescent, the margins scabrous and with a few long, scattered hairs; spikelets 2-2.2 mm. long, elliptic, more or less obovate, apiculate; second glume and sterile lemma densely pubescent, 3-nerved, the marginal ones strongly scabrous; fruit pale, striate.

Type in the U. S. National Herbarium, No. 1039605, collected on open savannas, Estate Gavinho, Marajó Island, Pará, Brazil, June 1918, by André Goeldi (No. 197).

Additional specimens examined: Brazil: Pará: Marajó Island: Estate Gavinho, Goeldi 169, 180, 185, 192, 193, 200, 250; Fazenda Menino Deus, Black & Engelhard 50-9028, 50-9038, 50-8982; Soure: Black & Camargo 8873, 8876; Monte Alegre, Swallen 3336; Ceará: Sobral, Avelino & Black 118c.

7. *PASPALUM DENTICULATUM* Trin. Gram. Pan. 111. 1826.



8. *PASPALUM HUMIGENUM* Swallen, sp. nov.

Culmi erecti, 20-42 cm. alti, glabri; laminae planae, 12 cm. longae, 2-4 mm. latae, glabrae, marginibus scabrae; racemi 4-8, appressi vel adscendentes, usque 2 cm. longi; rachis prominente ciliata pilis 7 mm. longis; spiculae 1.3-1.4 mm. longae, ellipticae vel obovatae, apiculatae, glabrae.

Perennial; culms erect or geniculate at the lower nodes, 20-42 cm. tall, sometimes branching at the lower nodes, glabrous; sheaths all much shorter than the internodes, compressed, keeled, glabrous, the uppermost glabrous; ligule 3 mm. long; blades flat, as much as 12 cm. long, 2-4 mm. wide, glabrous on both surfaces, the margins scabrous; inflorescence 2.5-5 cm. long, composed of 4-8 appressed or ascending racemes as much as 2 cm. long; rachis 0.5 mm. wide, pilose in the axils, glabrous, the margins scabrous, ciliate with prominent white hairs about 7 mm. long; spikelets 1.3-1.4 mm. long, elliptic-obovate, purple-tinged, sometimes apiculate, glabrous; second glume and sterile lemma 3-nerved, the marginal nerves very scabrous; fruit pale, minutely striate.

Type in the U. S. National Herbarium, No. 1255130, collected near river inside zone of *Typha* and sedges at Rio Salitre, 46 km. west-southwest of Joazeiro, Bahia, Brazil, December 15, 1924, by Agnes Chase (No. 7931).

## Recta

9. *PASPALUM PETROSUM* Swallen, sp. nov.

Culmi caespitiosi, erecti, 70-85 cm. alti, glabri; vaginae basi tomentosae; laminae 35 cm. longae, involutae, basi papilloso-hispidae; racemi 5-8, adscendentes, inferiores 4-5 cm. longi; spiculae solitariae vel binae, 1.8-1.9 mm. longae, glabrae, pedicellis pubescentibus 0.5 mm. longis.

Perennial; culms tufted, erect, 70-85 cm. tall, glabrous; sheaths tomentose at the base, becoming pilose at the summit, those of the culm glabrous except for long hairs in the mouth, almost bladeless; blades involute, as much as 35 cm. long, curved, papilloso-hispid at the base, the hairs long, becoming glabrous in the upper half, the inner surface pubescent; inflorescence 4-8 cm. long, composed of 5-8 ascending racemes, the lower 4-5 cm. long, the rachis 0.4-0.5 mm. wide, glabrous; spikelet solitary or sometimes paired, 1.8-1.9 mm. long, on usually pubescent pedicels 0.5 mm. long; second glume and sterile lemma elliptic, broadly acute, 5-nerved, the midnerve much stronger than the lateral, glabrous; fruit as long as the spikelet, smooth or minutely striate, shining.

Type in the U. S. National Herbarium, No. 1910825, collected on open ledge of mountainside, Cerro Camejen,



about 1°N, 72°W, Vaupés, Colombia, July 24, 1943, by Carl O. Grassl (No. 10015).

Apparently this species belongs to the Recta group, but the racemes are paniculate rather than solitary or in pairs.

#### Quadrifaria

#### 10. PASPALUM CHAPADENSE Swallen, sp. nov.

Culmi erecti, 90 cm. alti, nodis pilosis; laminae erectae, 30-32 cm. longae, 12 mm. latae, marginibus papilloso-ciliatis; racemi 28, adscendentes, 5-6 cm. longi; spiculae densae, binae, 1.6-1.8 mm. longae, 0.8 mm. latae, acutae, dense pubescentes; gluma secunda spicula brevior.

Perennial; culms erect, 90 cm. tall, the nodes appressed-silky-pilose; sheaths all longer than the internodes, glabrous, ciliate toward the summit, with some hairs on the collar; blades erect or nearly so, those of the midculm 30-32 cm. long, 12 mm. wide, the lower ones and the uppermost reduced, scabrous and papillose-ciliate on the margins; inflorescence 18 cm. long, composed of 28 slender ascending racemes 5-6 cm. long, the rachis 0.3-0.4 mm. wide, densely hairy in the axils; spikelets dense, paired, 1.6-1.8 mm. long, 0.8 mm. wide, acutish, elliptic-obovate, densely pubescent, the pedicels less than 0.5 mm. long; second glume shorter than the spikelet exposing the light minutely striate fruit.

Type in the U. S. National Herbarium, No. 2238394, collected in chapada between Caxias and Barra do Corda, Maranhão, Brazil, February 18-26, 1934, by Jason R. Swallen (No. 3508). This species has been collected in northeastern Brazil, as follows: Maranhão: Brejo (São Luis to São José), Swallen 3474; Caxias to Barra do Corda, Swallen 3519, 3562, 3563, 3565, 3566, 3601; Barra do Corda to Grajahú, Swallen 3768; Carolina to San Antonio de Balsas, Swallen 4012. Ceará: Swallen 4652. Pernambuco: Tapera, Pickel 1239.

The number of racemes varies in this species, from 4-28, but there are no other differences to note.

#### 11. PASPALUM DASYTRICHIUM Dusen, sp. nov.

Culmi 140 cm. alti, internodiis inferioribus abbreviatis, nodi appresso-villosi; ligula ca. 1 cm. longa; laminae 30 cm. longae, 14 mm. latae, planae, firmae, appressae, papilloso-ciliatae; racemi 25, adscendentes, usque 9 cm. longi; spiculae 2 mm. longae, 0.8 mm. latae, ellipticae; gluma secunda fructu 1/4-1/2 brevior.

Perennial; culms hard, erect from a decumbent base, 140 cm. tall, the lower internodes much shortened, their accompanying leaves falling early, leaving the base of



the culm densely villous, the upper internodes glabrous, glaucous, the nodes appressed villous; sheaths densely ascending papillose-villous toward the base becoming less so toward the summit, the upper ones papillose only or glabrate; ligule firm, brown, about 1 cm. long; blades of the midculm as much as 30 cm. long, 14 mm. wide, firm, flat, appressed, papillose-ciliate, the hairs about 5 mm. long; inflorescence 25 cm. long, composed of 25 or more ascending racemes, the lower one as much as 9 cm. long, becoming shorter toward the summit, bearing short appressed branchlets, especially toward the base; spikelets 2 mm. long, 0.8 mm. wide, brown, elliptic; second glume thin, nerveless,  $1/2-3/4$  as long as the fruit, often as long as the fruit, 1-3-nerved, the sterile lemma as long as the fruit, 3-nerved; fruit light-colored, the same shape and size as the spikelet.

Type in the U. S. National Herbarium, No. 2302271, collected among rocks, Villa Velha, Paraná, Brazil, October 21, 1914, by P. Dusen (No. 15700). This species is credited to Dusen because the name is written on the label as a new species, but it was never published. Also collected in São Paulo, at Caietras by Kuhlman (No. 36620), and at Brigadeiro Tobias by Hoehne & Gehrt (No. 36726).

### Linearia

#### 12. PASPALUM VESCUM Swallen, sp. nov.

Culmi erecti, gracillimi, 25-35 cm. alti; laminae 5-15 cm. longae, filiformes, glabrae; racemus 1, erectus, 2-3 cm. longus; spiculae solitariae vel binae, 2.3-2.7 mm. longae, pallidae, pedicellis 1 mm. longis scabris; gluma secunda et lemma sterile tenuia, 3-nervia, glabra; gluma secunda fructu  $1/5-1/4$  brevior.

Perennial; culms erect, very slender, solitary or 2 together in small tough tufts, 25-35 cm. tall, with one culm node, glabrous; sheaths glabrous, or occasionally with a few long hairs, the culm sheath bladeless; ligule 0.5-1 mm. long, decurrent; blades 5-15 cm. long, filiform, usually glabrous, but sometimes with a few long scattered hairs; raceme 1, erect, 2-3 cm. long; spikelets solitary or paired, somewhat inflated, 2.3-2.7 mm. long, pale, on round scabrous pedicels about 1 mm. long; second glume and sterile lemma thin, apparently 3-nerved, glabrous, the glume about  $3/4-4/5$  as long as the pale, pointed, minutely striate fruit.

Type in the U. S. National Herbarium, No. 1448779, collected in peaty soil on boggy slope, at Uberlandia, Minas Gerais, Brazil, by Agnes Chase (No. 11259).

Also collected in "Terreno brejoso beira correjo de Baú," Campo Alegre, São Paulo, Brazil, by Toledo & Gehrt (Dept. Bot. São Paulo 43200).



13. PASPALUM CRISPULUM Swallen, sp. nov.

Culmi gracillimi, dense caespitosi, 23-33 cm. alti; laminae usque 10 cm. longae, filiformes, sparse papilloso-pilosae; racemi 2, conjugati, adscendentes; spiculae 1.9-2 mm. longae, 0.8 mm. latae, solitariae, elliptico-lanceolatae, glabrae; fructus albus, apiculatus, minute striatus.

Perennial; culms very slender, in dense tufts, 2-noded, 23-33 cm. tall; sheaths shorter than the internodes, glabrous or with a few long hairs in the throat, nearly bladeless, those of the innovations appressed-pilose, the two culm sheaths nearly bladeless; blades mostly basal, less than 10 cm. long, filiform, often curved, sparsely long papillose-pilose to nearly glabrous; racemes 2, conjugate, ascending, the rachis about 0.4 mm. wide, the basal portion and upper part of the culm long-pilose; spikelets 1.9-2 mm. long, 0.8 mm. wide, solitary, elliptic-lanceolate, glabrous, not crowded, the pedicels about 0.4 mm. long; sterile lemma 5-nerved, the lateral nerves approximate, the second glume 5-nerved, the nerves more evenly spaced; fruit white, dull, minutely striate, apiculate.

Type in the U. S. National Herbarium, No. 2208290, collected on campo at Macido, Niquelandia, Goias, Brazil, by A. Macedo (No. 4432).

14. PASPALUM PALLENS Swallen, sp. nov.

Culmi erecti, compressi, 115 cm. alti, glabri; laminae 10-20 cm. longae, adscendentes, involutae, supra dense pubescentes; racemi 2, conjugati, 7-9 cm. longi; spiculae 3.4 mm. longae, 1.2 mm. latae, anguste ellipticae, glabrae; fructus albus, minute punctatus.

Perennial; culms erect, soft, compressed, about 115 cm. tall, glabrous; sheaths overlapping on the lower part of the culm, shorter than the internodes above, compressed, keeled, glabrous; ligule very thin and fragile, 5 mm. long, hidden, not excurrent; blades 10-20 cm. long, ascending, more or less curved, inrolled, densely pubescent on the upper surface, glabrous beneath; racemes 2, conjugate, ascending, 7-9 cm. long, the rachis 0.5-0.6 mm. wide, glabrous even on the margins; spikelets 3.4 mm. long, 1.2 mm. wide, narrowly elliptic, on glabrous pedicels about 1 mm. long; second glume and sterile lemma equal, faintly 5-nerved, glabrous, light green; fruit white, minutely punctate-roughened.

Type in the U. S. National Herbarium, No. 1982916, collected in lake, at Santa Terezinha, Ituiutaba, Minas Gerais, Brazil, February 18, 1950, by A. Macedo (No. 2167). A second collection was made at the same time and place (Macedo 2164).



15. *PASPALUM FESSUM* Swallen, sp. nov.

Culmi graciles, erecti, 50 cm. alti, glabri; laminae graciles, involutae, 14-19 cm. longae, supra minute pubescentes; racemi 2, conjugati, 3-5 cm. longi, glabri; spiculae 2.4 mm. longae, 0.8 mm. latae, pallidae, pedicellis 0.5 mm. longis, glabris; gluma secunda et lemma sterile pallida, tenuia, 5-nervia, glabra; fructus albus, obtusus, marginibus parallelis.

Perennial; culms slender, erect from an ascending base, 50 cm. tall, glabrous, the lower internodes short; sheaths all shorter than the internodes, glabrous; ligule 5 mm. long, decurrent, very thin and fragile, brown; blades slender, inrolled, 14-19 cm. long, glabrous on the lower surface, densely and minutely pubescent on the upper; racemes 2, conjugate, ascending, 3-5 cm. long, about 0.4 mm. wide, glabrous throughout; spikelets 2.4 mm. long, 0.8 mm. wide, pale, on glabrous pedicels about 0.5 mm. long; second glume and sterile lemma pale, thin, faintly 5-nerved, rounded at the summit, just covering the fruit; fruit white or greenish-white, round at the tip, the sides nearly parallel, minutely striate.

Type in the U. S. National Herbarium, No. 2076285, collected in sandy humid soil on the bank of the Rio Paranaíba, Praiã, Ituiutaba, Minas Gerais, Brazil, September 3, 1950, by A. Macedo (No. 2543).

16. *PASPALUM AMBUSTUM* Swallen, sp. nov.

Culmi dense caespitiosi, erecti, 75-100 cm. alti; laminae 30-50 cm. longae ad basim longiattenuatae, supra dense et molliter pilosae, marginibus scabrosis; racemi 8 vel 9, 4-5 cm. longi, appressi; spiculae binae, 3.4-3.6 mm. longae, 1.8 mm. latae, ellipticae, glabrae; fructus pallidus, compressus, papillosum.

Perennial; culms densely tufted, erect, 75-100 cm. tall; sheaths all longer than the internodes, the uppermost partly enclosing the base of the panicle; basal blades 30-50 cm. long, long-attenuate to the base, densely and softly pilose above, glabrous beneath, the margins very scabrous, the upper culm blades much smaller; inflorescence 12-14 cm. long, composed of 8 or 9 appressed racemes, 4-5 cm. long, the rachis 0.8 mm. wide, very scabrous on the margins; spikelets in pairs, 3.4-3.6 mm. long, 1.8 mm. wide, elliptic, bluntly acute, glabrous; fruit pale, flattened, papillose-roughened.

Type in the U. S. National Herbarium, No. 1961593, collected in banhado, Estação Experimental, Ponta Grossa, Paraná, Brazil, February 5, 1946, by Jason R. Swallen (No. 8466).

The following specimens probably can be referred to this species: Swallen 8429, 8791.

*Paspalum ambustum* appears to be between the



Linearia and Virgata groups. It has the habit of other species of the Linearia group but the blades are very scabrous on the margins and the spikelets are in pairs, characters of the Virgata group.

Eriantha

Blades narrow, involute.

Spikelets 5 mm. long; racemes erect, appressed.

17. P. album

Spikelets 3.6-3.8 mm. long; racemes ascending.

Spikelets long-pilose or papillose-pilose, the hairs not obscuring the spikelet.

18. P. diamantinum

Spikelets densely covered with long silky hairs, obscuring the spikelet.....

19. P. involutum

Blades flat, broader.

Blades densely and softly pilose.. 20. P. mollifolium

Blades glabrous or more or less hispid.

Spikelets 4-4.2 mm. long.

Blades glabrous, narrower at the base than the mouth of the sheath.....

21. P. rigens

Blades conspicuously spreading-pilose or hispid, narrowed but wider than the mouth of the sheath.....

22. P. intonsum

Spikelets not more than 3.6-3.7 mm. long.

Blades 8-10 mm. wide, evenly distributed.

23. P. haughtii

Blades not more than 5 mm. long, usually less, mostly crowded to the base of the plant.

Spikelets 3 mm. long; blades glabrous.

24. P. sericatum

Spikelets 3.6-3.7 mm. long; blades hirsute.

Culms loosely tufted, rhizomatous; blades

3-8 cm. long..... 25. P. paucifolium

Culms densely tufted, not rhizomatous; blades

8-14 cm. long..... 26. P. formosulum

17. PASPALUM ALBUM Swallen, sp. nov.

Culmi erecti, 90 cm. alti, glabri, nodis barbatis; laminae involutae, illa innovationum 12-17 cm. longae, pilosae, hae culmorum usque 45 cm. longae, glabrae; racemi 3-6, anguste adscendentes, inferiores 7 cm. longi; spiculae binae, 5 mm. longae; gluma secunda et lemma sterile acuminata, dense villosa, 5-nervia; fructus 4 mm. longus, acutus, pallidus, striatus.

Perennial; culms erect, 90 cm. tall, glabrous, the nodes bearded with ascending silky hairs; lower sheaths appressed-pilose, the upper elongate, glabrous, nearly bladeless; ligule brown, membranaceous, 1 mm. long; blades loosely involute, those of the innovations 12-17 cm. long, pilose, those of the culm as much as 45 cm. long, glabrous or nearly so; inflorescence 9-10



cm. long, composed of 3-6 narrowly ascending racemes, the lower 7 cm. long; rachis 1 mm. wide, scabrous on the margins; spikelets in pairs, 5 mm. long; second glume and sterile lemma acuminate, densely villous, 5-nerved, the lateral nerves marginal; fruit 4 mm. long, acute, pale, striate.

Type in the U. S. National Herbarium, No. 1500420, collected in sand and gravel on campo, Diamantina, Serra de San Antonio, Minas Gerais, Brazil, altitude 1200-1300 meters, by Agnes Chase (No. 10397).

18. *PASPALUM DIAMANTINUM* Swallen, sp. nov.

Culmi erecti, 65-75 cm. alti, compressi, glabri; laminae 17-26 cm. longae, plerumque plicatae, 1 mm. latae, supra pubescentes vel pilosae; racemi 3-5, approximati, adscendentes, 7-9 cm. longi, rachis 0.6 mm. lata marginibus scabra; spiculae 3.6-3.8 mm. longae; gluma secunda et lemma sterile 5-nervia, villosa pilis 1 mm. longis.

Perennial; culms erect, 65-75 cm. tall, flattened, glabrous, the nodes pubescent or pilose; sheaths compressed, keeled, mostly crowded toward the base, the lowermost densely pubescent or pilose, the upper elongate, glabrous, nearly bladeless; ligule a membranaceous rim 0.5 mm. long; blades 17-26 cm. long, usually folded, 1 mm. wide as folded, ascending, pubescent or pilose on the upper surface, or glabrous toward the tip, glabrous beneath; inflorescence composed of 3-5 approximate, ascending racemes 7-9 cm. long, the rachis 0.6 mm. wide, scabrous on the margins; spikelets 3.6-3.8 mm. long, the second glume and sterile lemma 5-nerved, the nerves almost equidistant, villous or papillose-villous with white, spreading hairs about 1 mm. long; fruit as long as the spikelet, greenish, oblong, broadly acute.

Type in the U. S. National Herbarium, collected on white sand and gravel, Diamantina, Serra de San Antonio, Minas Gerais, Brazil, December 27-30, 1929, by Agnes Chase (No. 10401). Also collected near the type locality by Agnes Chase (No. 10347). The racemes of the latter specimen are 1 or 2, and the blades are shorter and finer.

*Paspalum diamantinum* is related to *P. ammodes* Trin. which has been placed by Agnes Chase in the *Ceresia* group along with species having a winged rachis. However, it belongs in a separate group closely allied to the "Erianthae."

19. *PASPALUM INVOLUTUM* Swallen, sp. nov.

Culmi caespitosi, erecti, 55-70 cm. alti, glabri; laminae 8-15 cm. longae, involutae, ca. 1 mm. latae, fere glabrae, racemi 3, 3.5-5.5 cm. longi, adscendentes; spiculae 3.6 mm. longae, dense longi-pilosae; fructus spicula brevior, acutus, pallidus.



Perennial; culms tufted, erect, 55-70 cm. tall, glabrous; lowermost sheath densely appressed-pilose, those of the culm elongate, glabrous, the uppermost nearly bladeless; ligule about 1 mm. long, decurrent; blades 8-15 cm. long, inrolled, less than 1 mm. wide, glabrous or with a very few scattered hairs; inflorescence composed of 3 ascending racemes 3.5-5.5 cm. long on an axis about 4 cm. long; rachis 1.2 mm. wide, purple, glabrous, the margins obscurely scabrous; spikelets 3.6 mm. long, densely covered with long white hair obscuring the spikelet; fruit shorter than second glume and sterile lemma, acute, pale.

Type in the U. S. National Herbarium, No. 1500757, collected in white sand and gravel at Diamantina, Serra de San Antonio, Minas Gerais, Brazil, 1200-1300 meters altitude, December 27-30, 1929, by Agnes Chase (No. 10400).

20. *PASPALUM MOLLIFOLIUM* Swallen, sp. nov.

Culmi dense caespitiosi, 55 cm. alti, nodis appresso-barbatis; laminae 10-22 cm. longae, 2-3 mm. latae, acuminatae, dense pilosae; racemi 3 vel 4, inferior 4.5 cm. longus; rachis costa et marginibus pilosa; spiculae 3 mm. longae, solitariae vel binae, dense villosae.

Perennial; culms in dense tufts, 55 cm. tall, the nodes densely appressed-bearded with yellowish hairs; sheaths mostly basal, densely pilose with ascending or spreading hairs, the lower one densely tomentose at the base; blades 10-22 cm. long, 2-3 mm. wide, densely and softly pilose on both surfaces, acuminate, somewhat narrowed toward the base; inflorescence slender, 4 to 5 cm. long, composed of 3 or 4 racemes, the lower 4.5 cm. long, the rachis 1 mm. wide, pilose on the back and margins; spikelets 3 mm. long, solitary or paired, densely covered with long appressed white hairs extending beyond the spikelet; fruit a little shorter than the second glume and sterile lemma, pale, acute.

Type in the U. S. National Herbarium, No. 1500690, collected on campo near Faria, Serra da Bocaina, Minas Gerais, Brazil, altitude 1000-1200 meters, January 6, 1930, by Agnes Chase (No. 10522). Also collected near the type locality by Agnes Chase (No. 10509).

21. *PASPALUM RIGENS* Swallen, sp. nov.

Culmi erecti, 85-95 cm. alti, glabri; vagina infirma basi dense tomentosa; laminae 15-18 cm. longae, 3-5 mm. latae, acuminatae, glabrae; racemi 3 vel 4, 6-9 cm. longi, adscendentes vel patentibus; spiculae 4 mm. longae, dense villosae.

Perennial; culms erect, 85-95 cm. tall, glabrous, the lower nodes densely appressed-hispid; sheaths glabrous, the lowermost densely tomentose at the base;



blades 15-18 cm. long, 3-5 mm. wide, glabrous, acuminate, narrowed to the base, narrower than the mouth of the sheath; inflorescence composed of 3 or 4 ascending or spreading racemes 6-9 cm. long, on an axis 5-7 cm. long; spikelets 4 mm. long, densely white-silky-villous, completely obscuring the spikelets; fruit a little shorter than the second glume and sterile lemma, acute, pale.

Type in the U. S. National Herbarium, No. 1500399, collected on gravelly slope, 5-10 km. west of Diamantina, Serra de San Antonio, Minas Gerais, Brazil, 1300-1500 meters, December 27-30, 1929, by Agnes Chase (No. 10442). Also collected at Faria, Serra da Bocaina, Minas Gerais, by Agnes Chase (No. 10521); Serra de Cipó, George Black.

22. *PASPALUM INPONSUM* Swallen, sp. nov.

Culmi erecti, 50-70 cm. alti, glabri; laminae 19-24 cm. longae, 3-6 mm. latae, acuminatae, conspicue pilosae pilis appressis vel patentibus 4 mm. longis; racemi 4, adscendentes vel appressi, inferiores usque 7 mm. longi; spiculae 4.2 mm. longae, dense villosae.

Perennial; culms erect, 50-70 cm. tall, glabrous; sheaths appressed-pilose to glabrous; ligule a membranous rim less than 0.5 mm. long; blades erect or ascending, rather stiff, 19-24 cm. long, 3-6 mm. wide, acuminate, narrowed slightly toward the base to the width of the sheaths, conspicuously covered on both surfaces with appressed or spreading hairs, mostly 4 mm. long, densely pubescent just above the ligule as well; inflorescence composed of 4 ascending or appressed racemes, the lower as much as 7 cm. long; rachis 1 mm. wide, hispid on the margins; spikelets 4.2 mm. long, covered with white silky appressed hairs obscuring the spikelet; fruit a little shorter than the second glume and sterile lemma, pale, acute.

Type in the U. S. National Herbarium, No. 1501433, collected on hillside campo, Hargreaves, Minas Gerais, Brazil, December 21-22, 1929, by Agnes Chase (No. 10268 $\frac{1}{2}$ ).

23. *PASPALUM HAUGHTII* Swallen, sp. nov.

Culmi erecti, 130 cm. alti, basi dense villosi, nodis dense appresse-villosis; vaginae marginibus papilloso-ciliatae; laminae 15-26 cm. longae, 0.8-1 cm. latae, marginibus base papilloso-ciliatis ceterum glabrae; racemi 6, adscendentes, inferiores usque 8 cm. longi; spiculae 3.5 mm. longae, binae brevipedicellatae; gluma secunda et lemma sterile acuta, 5-nervia, dense villosa; fructus ellipticus, acutus, pallidus, striatus, spiculum aequans.

Perennial; culms erect, 130 cm. tall, from a rhizome-like base, densely villous with white or reddish



hairs, the nodes densely appressed-villous; lowermost sheaths densely villous toward the base, the upper ones glabrous on the back, papillose-ciliate on the margins; blades 15-26 cm. long, 0.8-1 cm. wide, ascending, gradually narrowed toward the base or subcordate, the margins papillose-hispid toward the base, otherwise glabrous; inflorescence 8-11 cm. long, with 6 ascending racemes, the lower as much as 8 cm. long, 0.9 mm. wide; spikelets 3.5 mm. long, paired, short-pedicellate; second glume and sterile lemma equal, acute, 5-nerved, densely villous with white hairs, the hairs longer on the margins; fruit elliptic, acute, pale, striate, as long as the spikelet.

Type in the U. S. National Herbarium, No. 1706822, collected in open bunches on llanos, about 60 km. S 60° E of Orocué, Comisaría EL Vichada, Los Llanos, Colombia, by Oscar Haught (No. 2771).

Paspalum haughtii is closely related to P. erianthus Nees, but differs in being a much taller plant with glabrous foliage evenly distributed on the culm and longer and laxer racemes. Another specimen which matches P. haughtii very closely was collected at Braco, Rio Arinos, Mato Grosso, Brazil, by J. T. Baldwin (No. 3077).

24. PASPALUM SERICATUM Swallen, sp. nov.

Culmi caespitosi, erecti, 40-60 cm. alti; vaginae inferiores appresso-villosae, superiores glabrae; laminae basi aggregatae, 5-10 cm. longae, 2-2.5 mm. latae, acuminatae, glabrae; racemi 2 vel 3, anguste adscendentes; spiculae solitariae, 3 mm. longae, dense villosae, pili spiculum obscurans.

Perennial; culms caespitose, erect, 40-60 cm. tall, the leaves clustered at the base, the culm sheaths bladeless or nearly so, the base slightly enlarged, tomentose; lower sheaths densely appressed-pilose, the upper glabrous or nearly so; ligule a short membranous rim about 0.5 mm. long; blades mostly basal, 5-10 cm. long, 2-2.5 mm. wide, acuminate, glabrous on both surfaces with a few long hairs on the margins toward the base; racemes 2 or 3, narrowly ascending, the rachis 4.5-7 cm. long, glabrous, with a tuft of long hairs in the axils; spikelets solitary, 3 mm. long, densely villous with white or tawny appressed hairs, completely obscuring the spikelet.

Type in the U. S. National Herbarium, No. 1255284, collected on rocky open slope, Chapeo de Sol, Serra do Cipó, Minas Gerais, Brazil, altitude 1000-1100 meters, March 28-April 1, 1925, by Agnes Chase (No. 9213).

The following specimens may be referred to this species, all from the State of Minas Gerais: Belo Horizonte, Chase 10315; Faria, Serra da Bocaina, Chase 10512; Barbacena, Glazion 16558.



25. *PASPALUM PAUCIFOLIUM* Swallen, sp. nov.

Culmi erecti, 35 cm. alti, glabri, rhizomatibus curtis tomentosus; laminae 3-8 cm. longae, 3-5 mm. latae, sparse vel dense papilloso-hispidae; racemi 3, appressi, 2-2.5 cm. longi; spiculae 3.6-3.7 mm. longae, solitariae; gluma secunda et lemma sterile acuminata, fructu longiora; gluma secunda hirsuta pilis longis spiculam obscurans; lemma sterile pilosum; fructus pallidus, acutus.

Perennial; culms erect in loose groups from short tomentose rhizomes, 35 cm. tall, glabrous; sheaths rather densely hispid or papillose-hispid, those of the culm nearly bladeless, almost glabrous; blades 3-8 cm. long, 3-5 mm. wide, sparsely to rather densely papillose-hispid; racemes 3, closely appressed, 2-2.5 cm. long, the rachis 0.8 mm. wide, pilose in the axils; spikelets 3.6-3.7 mm. long, solitary; second glume and sterile lemma acuminate, extending a little beyond the fruit, the glume densely hirsute, the hairs long, obscuring the glume, the sterile lemma pilose, the lemma plainly evident; fruit shorter than the spikelet, pale, acute.

Type in the U. S. National Herbarium, No. 1258166, collected by Sellow (number and date not given). Other specimens which may be referred to this species are: Brazil: Rio Grande do Sul: S. Jeronymo, J. Dutra 546; Pedro Orth 1943. Argentina: Provincia de Corrientes: Mercedes, L. R. Parodi 6295.

26. *PASPALUM FORMOSULUM* Swallen, sp. nov.

Culmi erecti, ca. 60 cm. alti, glabri; vaginae inferiores dense pilosae, basi tomentosae; laminae 8-14 cm. longae, 3-5 mm. latae, acuminatae, hirsutae; racemi 3 vel 4, adscendentes, inferior ca. 6 cm. longus; spiculae 3.6 mm. longae, dense villosae; fructus spicula brevior, pallidus, acutus.

Perennial; culms erect, about 60 cm. tall, glabrous; lower sheaths densely spreading pilose, tomentose at the base, those of the culm glabrous or with a few long hairs near the summit, elongate, nearly bladeless; ligule a membranaceous rim, 0.2 mm. long; blades crowded toward the base, 8-14 cm. long, 3-5 mm. wide, flat, acuminate, hirsute on both surfaces; inflorescence 6-7 cm. long, composed of 3 or 4 ascending racemes, the lower one about 6 cm. long, the rachis 0.9 mm. wide, purple, contrasting sharply with white-haired spikelets; spikelets 3.6 mm. long, completely hidden by the long hairs; fruit shorter than the spikelet, pale, acute.

Type in the U. S. National Herbarium, No. 1501432, collected in small tufts on hillside campo, Hargreaves, Minas Gerais, Brazil, 1350-1400 meters, December 21-22, 1929, by Agnes Chase (No. 10268). Also collected by Agnes Chase near the type locality (No. 10226).



## Plicatula

27. PASPALUM INDUTUM Swallen, sp. nov.

Culmi erecti, ca. 1 m. alti, infra paniculas pilosi; laminae erectae vel patentae, 24-40 cm. longae, 7-10 mm. latae, dense pilosae; racemi 2-6, appressi vel adscendentes, 8-18 cm. longi; spiculae 3 mm. longae, 2.0-2.3 mm. latae, obovatae, dense pilosae; fructus obscure rubiginosus.

Perennial; culms erect, over 1 m. tall, rather stout, pilose below the panicle; sheaths all longer than the internodes, densely appressed-pilose; blades firm, erect or somewhat spreading, acuminate, 24-40 cm. long, 7-10 mm. wide, densely pilose like the sheaths, the upper 1-3 greatly reduced; racemes 2-6, ascending or appressed, 8-18 cm. long, the rachis long-pilose like the culm; spikelets 3 mm. long, 2.0-2.3 mm. wide, on short thickened pedicels 0.5-1 mm. long, slightly obovate, the second glume and sterile lemma rather densely appressed-pilose; fruit dark reddish-brown.

Type in the U. S. National Herbarium, No. 601133, collected at "Rio do Terra Vermehha," Paraná, Brazil, March 1, 1909, by P. Dusen (No. 7883).

Additional material examined: Brazil: Paraná: Jaguarihyoa, Dusen 16411; Vilha Velha, Ponta Grossa, Pereira 5202, 5285. Mato Grosso: Campanario, Otero 299. Minas Gerais: Serra do Curral, Chase 8923.

28. PASPALUM LUTICOLUM Swallen, sp. nov.

Culmi 1.5 m. longi, basi 7 mm. crassi, glabri; laminae 20-30 cm. longae, 5-8 mm. latae, attenuatae, marginibus scabris; racemi 10, inferior 12 cm. longus; spiculae 2.1 mm. longae, 1.1-1.3 mm. latae, acutae, glabrae; fructus 2.1 mm. longus, ferruginosus, acutus, striatus.

Aquatic perennial; culms about 1.5 m. long, 7 mm. thick at the base, rather soft and succulent, glabrous; sheaths all longer than the internodes, the upper elongate, nearly reaching the base of the panicle, sparsely hispid toward the summit, somewhat inflated; blades 20-30 cm. long, 5-8 mm. wide, attenuate, with a few long hairs at the base, very scabrous on the margins; inflorescence pyramidal, about 12 cm. long, composed of 10 racemes, the lower 12 cm. long, the uppermost 4 cm., the rachis 2 mm. wide, glabrous, the margins scabrous; spikelets 2.1 mm. long, 1.1-1.3 mm. wide, acute, glabrous, the pedicels slender, about 1 mm. long, almost glabrous; second glume and sterile lemma loose, ruffled, thin, glabrous; fruit 2.1 mm. long, light brown, acute, striate-roughened.

Type in the U. S. National Herbarium, No. 2205852, collected in Lago Uruxiacá, Maicurú, Pará, Brazil, June 16, 1952, by J. M. Pires & Nilo T. Silva (No. 4298).



29. *PASPALUM LACUSTRE* Chase, sp. nov.

Culmi compressi, graciles, 1 m. longi; laminae planae, 3.5-14 cm. longae, 2-4 mm. latae, glabrae; racemi 4 vel 5, graciles, adscendentes, 3.5-6 cm. longi; spiculae solitariae, 2.5 mm. longae, glabrae; gluma secunda et lemma sterile aequalia, 3-nervia, glabra, fructu longiora; fructus 2 mm. longus, 0.9 mm. latus, pallidus.

Aquatic perennial; culms submerged or floating, slender, compressed, glabrous, 1 m. or more long, the internodes 4-15 cm. long, shorter toward the summit; sheaths rather loose, stiffly ciliate toward the summit, otherwise glabrous, the upper longer than the internodes; ligule membranaceous, 1.5 mm. long, erose; blades flat, lax, 3.5-14 cm. long, 2-4 mm. wide, glabrous; panicle included at base, composed of 4 or 5 slender ascending to somewhat loosely spreading racemes, 3.5-6 cm. long; rachis thin, flat, 1-1.5 mm. wide, glabrous, the margins scabrous; spikelets solitary, 2.5 mm. long, on slender pedicels about 1 mm. long, in 2 rows, contiguous but not crowded; second glume and sterile lemma equal, thin, 3-nerved, pale, glabrous, pointed beyond the fruit; fruit 2 mm. long, 0.9 mm. wide, pale.

Type in the herbarium of the Instituto Agronomico do Norte, Belém, Pará, Brazil, No. 64326, collected in water of a deep lake at Ambé, Amapá, Brazil, July 8, 1951, by Richard L. Fróes & George A. Black (No. 27312). Photograph and fragment in the U. S. National Herbarium.

30. *PASPALUM CORDAENSE* Swallen, sp. nov.

Culmi 25-50 cm. alti, nodis inferioribus ramosi; laminae 8-25 cm. longae, 4-6 mm. latae, papilloso-pilosae, marginibus scabris; racemi 2, 3.5-8 cm. longi; spiculae binae, 3-3.1 mm. longae, 2.3 mm. latae, obovatae, dense pilosae; fructus badius, nitidus.

Annual; culms erect or spreading, 25-50 cm. tall, branching at the lower nodes, glabrous; sheaths longer than the internodes, papillose-hispid with long spreading hairs, becoming glabrous toward the summit; ligule decurrent, 3 mm. long; blades 8-25 cm. long, 4-6 mm. wide, sparsely to densely covered with long papillose-based hairs, the margins scabrous; inflorescence composed of 2 racemes, 3.5-8 cm. long; spikelets in pairs, 3-3.1 mm. long, 2.3 mm. wide, obovate, rather densely pilose with spreading hairs, the first on short thick pedicels 0.5 mm. long, the second on more slender pedicels 1-1.3 mm. long; second glume 5-nerved, the nerves evenly spaced, the sterile lemma variously spotted with brown; fruit chestnut brown, striate, shining, with a rather conspicuous hump in the center.

Type in the U. S. National Herbarium, No. 2238395, collected on roadside through chapada, Barra do Corda



to Grajahú, Maranhão, Brazil, March 1-5, 1934, by Jason R. Swallen (No. 3618).

Another specimen of the type collection has 4 racemes, and blades as much as 10 mm. wide.

31. *PASPALUM CAPERATUM* Swallen, sp. nov.

Culmi erecti, 40-50 cm. alti, glabri; laminae 11-15 cm. longae, 2-4 mm. latae, acuminatae, dense pubescentes vel pilosae; racemi 2 vel 3, appressi; rachis 6-8 mm. lata, marginibus scabra; spiculae 2.7-2.8 mm. longae, 1.5 mm. latae, ellipticae, glabrae; gluma secunda et lemma sterile grosse rugosa.

Perennial; culms in small tufts, erect, 40-50 cm. tall, glabrous; sheaths overlapping, completely covering the culm, the lower ones densely pilose, the upper two on the culm glabrous below, becoming pilose toward the summit, with reduced blades; ligule 0.5 mm. long, brown; blades 11-15 cm. long, 2-4 mm. wide, acuminate, densely pubescent or pilose; inflorescence composed of 2 or 3 appressed racemes, the rachis 6-8 mm. wide, scabrous on the margins; spikelets 2.7-2.8 mm. long, 1.5 mm. wide, elliptic, glabrous, on short, angular, scabrous pedicels about 0.5 mm. long; second glume and sterile lemma very coarsely cross-wrinkled, the glume 5-nerved, the nerves evenly spaced.

Type in the U. S. National Herbarium, No. 1961377, collected on hill above swamp, Horta Florestal, Pelotas, Rio Grande do Sul, Brazil, April 23, 1946, by Jason R. Swallen (No. 9200).

This species is characterized by the erect racemes and the strongly wrinkled second glume and sterile lemma. It belongs to the group of species with evenly spaced lateral nerves of the second glume.

Although the spikelets are immature, a specimen collected on the Fazenda de Criação, Lages, Santa Catarina (Swallen 8138), is referred to this species.

32. *PASPALUM PARANAENSE* Swallen, sp. nov.

Culmi dense caespitiosi, erecti, ca. 50 cm. alti, glabri, infra nodis glandulosi; laminae erectae, 6-12 cm. longae, 2-4 mm. latae, acuminatae, dense pilosae; racemi 3, erecti, 4-6 cm. longi; spiculae 2.3-2.5 mm. longae, 1.5 mm. latae, binae, ellipticae vel obovatae, subglabrae; gluma secunda et lemma sterile glabra, nitida; fructus 2.2 mm. longus, brunneus, lucidus.

Perennial; culms in small dense tufts, erect, about 50 cm. tall, 3-noded, glabrous, with pale glandular depressions below the nodes; sheaths densely retrorsely pilose, with a very dense line on the collar, the upper two glabrous or pilose toward the summit; ligule 0.6 mm. long; blades erect, 6-12 cm. long, 2-4 mm. wide, acuminate, narrowed to the base, densely pilose, long-hairy above the ligule; inflorescence 4 cm.



long, composed of 3 erect racemes 4-6 cm. long, the rachis 0.6-0.8 mm. wide; spikelets 2.3-2.5 mm. long, 1.5 mm. wide, elliptic or somewhat obovate, in pairs, the pedicels 0.5-1 mm. long, nearly glabrous; second glume and sterile lemma shining, glabrous, the glume 5-nerved, the nerves nearly evenly spaced, very slightly shorter than the fruit at maturity; fruit dark brown, shining, 2.2 mm. long.

Type in the U. S. National Herbarium, No. 1961379, collected on campo, Fazenda Capão Redondo, Guarapuava, Paraná, Brazil, March 20-23, 1946, by Jason R. Swallen (No. 8889).

33. *PASPALUM GOYANUM* Swallen, sp. nov.

Culmi gracillimi, erecti, 110 cm. alti; laminae elongatae, attenuatae, 15-30 cm. longae, 0.5-1.5 mm. latae, glabrae; racemi 2 vel 3, adscendentes, usque 11 cm. longi; spiculae binae, 2.3-2.5 mm. longae, 1.3-1.4 mm. latae, glabrae; fructus brunneus, lucidus.

Perennial; culms very slender, erect or leaning, 110 cm. tall; sheaths mostly longer than the internodes, or the upper ones shorter, glabrous; ligule firm, 2.5-3 mm. long, protruding from the sheath, brown; blades elongate, attenuate to a fine point, 15-30 cm. long, 0.5-1.5 mm. wide, somewhat curled or flexuous, glabrous; inflorescence 10 cm. long, composed of 2 or 3 ascending racemes as much as 11 cm. long, glabrous in the axils, the rachis 0.6 mm. wide, glabrous, even on the margins; spikelets in pairs, elliptic or slightly obovate, 2.3-2.5 mm. long, 1.3-1.4 mm. wide, on nearly glabrous pedicels 0.5-1 mm. long; second glume 5-nerved, the lateral nerves not crowded, glabrous, at maturity a little shorter than the fruit; sterile lemma with a prominent midnerve, the margins broad, reaching almost to the midnerve, glabrous; fruit dark brown, shining.

Type in the U. S. National Herbarium, No. 1501446, collected on campo between Jataby and Rio Araguaya, Goyaz, Brazil, April 3, 1930, by Agnes Chase (No. 11733).

34. *PASPALUM PONTANALIS* Swallen, sp. nov.

Culmi basi decumbentes-patentes, ramosi, ca. 1 m. longi; laminae 15-26 cm. longae, 2.5-3 mm. latae, attenuatae, glabrae, marginibus scabrae; racemi 5, adscendentes, 6-8 cm. longi; spiculae binae, 2.3 mm. longae, 1.5 mm. latae, glabrae; fructus 2.2 mm. longus, brunneus, lucidus.

Perennial; culms decumbent-spreading at the base, sometimes stolon-like with almost equal internodes, freely branching, about 1 m. long; sheaths longer than the internodes, compressed, keeled, glabrous, as wide at the mouth as the base of the blade; ligule 1 mm. long, not noticeable from the side of the sheath;



blades 15-26 cm. long, 2.5-3 mm. wide, attenuate, usually very scabrous on the margins, otherwise glabrous; inflorescence 10 cm. long composed of 5 ascending racemes 6-8 cm. long; spikelets in pairs, 2.3 mm. long, 1.5 mm. wide, elliptic, on rather slender pedicels 1-1.5 mm. long, glabrous or the second glume sparsely pubescent; sterile lemma reddish brown with a broad light margin, the cross-wrinkles inconspicuous; fruit 2.2 mm. long, dark brown, shining.

Type in the U. S. National Herbarium, No. 1448664, collected in sand and muck on railroad embankment across pontanal, Porto Esperanço, Mato Grosso, Brazil, February 28, 1930, by Agnes Chase (No. 11080).

35. *PASPALUM MACEDOII* Swallen, sp. nov.

Culmi erecti, 110-120 cm. alti, glabri; laminae planae, 20-55 cm. longae, 5-10 mm. latae, attenuatae, supra basi pilosae; racemi 3 vel 4, 12-16 cm. longi, suberecti; spiculae binae, ovaes 3.3-3.5 mm. longae, 2.3 mm. latae; gluma secunda pilosa; lemma sterile glabrum vel sparse pilosum; fructus brunneus, lucidus.

Perennial; culms 110-120 cm. tall, erect, simple, glabrous; sheaths longer than the internodes, glabrous, the lowest ones densely appressed-bearded at the base; blades flat, 20-55 cm. long, 5-10 mm. wide, attenuate, pilose on the upper surface toward the base; racemes 3 or 4, suberect, 12-16 cm. long, the rachis slender, 0.8 mm. wide, glabrous even on the margins; spikelets in pairs, 3.3-3.5 mm. long, 2.3 mm. wide, oval, on round scabrous pedicels about 1 mm. long; second glume and sterile lemma fragile, dark brown, the glume sparsely to densely pilose, the sterile lemma glabrous or sparsely pilose; fruit very dark brown, smooth, shining, with a definite hump in the middle of the lemma.

Type in the U. S. National Herbarium, No. 2208261, collected on campo, Monte Alegre de Minas, Minas Gerais, Brazil, February 10, 1956, by A. Macedo (No. 4299). Also collected at Pirineus, Goias, by A. Macedo (No. 4359, 4366).

36. *PASPALUM LATIPES* Swallen, sp. nov.

Culmi erecti, 75 cm. alti, glabri vel nodis appresso-pilosis; laminae 15-30 cm. longae, 4-8 mm. latae, attenuatae, papilloso-hispidae; racemi 3 vel 4, adscendentes, 9-10 cm. longi; spiculae 3.5-3.7 mm. longae, 2 mm. latae, glabrae; lemma sterile marginibus elevatis.

Perennial; culms erect, 75 cm. tall, glabrous or the nodes appressed-pilose; sheaths longer than the internodes, keeled, glabrous to sparsely pilose on the back, the margins rather densely papillose-pilose; ligule about 2 mm. long; blades folded, 15-30 cm. long, 4-8 mm. wide, attenuate-pointed, papillose-hispid, the



hairs spreading; inflorescence 10-13 cm. long, composed of 3 or 4 narrowly ascending racemes, the lower 9-10 cm. long, the rachis 1-1.2 mm. wide, scabrous on the margins; spikelets 3.5-3.7 mm. long, 2 mm. wide, glabrous, the pedicels scabrous, about 1 mm. long; second glume 5-nerved, the lateral nerves marginal, the sterile lemma with a broad raised slightly wrinkled margin; fruit dark brown, striate, shining.

Type in the U. S. National Herbarium, No. 2010216, collected on campo, Ituiutaba, Minas Gerais, Brazil, March 8, 1950, by A. Macedo (No. 2188).

The species is closely related to *P. macedoi*, but the spikelets are differently shaped and glabrous. The specific name refers to the broad base of the spikelets.

37. *PASPALUM GUARICENSE* Swallen, sp. nov.

Culmi graciles, erecti, ramosi, 55-75 cm. alti; laminae 15-20 cm. longae, 4-7 mm. latae, basi conduplicatae, hirsutae; racemi 4-7, adscendentes, 3-6 cm. longi; spiculae binae, 1.8-1.9 mm. longae, 1.3-1.4 mm. latae, obovatae; gluma secunda et lemma sterile tenuia, 3-nervia.

Annual; culms slender, erect, branching at the lower nodes, 55-75 cm. tall; sheaths loose, compressed, keeled, hirsute, longer than the internodes, the upper one elongate with a very much reduced blade; ligule about 3 mm. long; blades about 15-20 cm. long, 4-7 mm. wide, conduplicate at the base, hirsute like the sheaths; inflorescence 9-12 cm. long, composed of 4-7 ascending racemes 3-6 cm. long, the rachis 1 mm. wide, rather sparsely papillose-ciliate, the hairs 3-4 mm. long; spikelet in pairs, 1.8-1.9 mm. long, 1.3-1.4 mm. wide, slightly obovate, the second glume and sterile lemma thin, 3-nerved, covering the brown striate fruit.

Type in the U. S. National Herbarium, No. 1343986, collected in humid places, El Dividive, Guarico, Venezuela, September 11, 1927, by H. Pittier (No. 12520).

38. *PASPALUM ATRATUM* Swallen, sp. nov.

Culmi erecti, valadi, 130 cm. alti; laminae elongatae, 1.5-2 cm. latae, marginibus scabrosae; racemi ca. 20, anguste adscendentes, inferiores usque 14 cm. longi, marginibus scabris; spiculae 3.1 cm. longae, 2 mm. latae, obovatae, glabrae; fructus ferrugineus, lucidus, minute striatus.

Perennial; culms erect, stout, 130 cm. tall; sheaths broad, loose, keeled, the lower ones crowded toward the base, the upper ones elongate, nearly reaching the base of the panicle, glabrous or a few long hairs on the margins toward the summit; ligule 1-2 mm. long, hidden in the sheath; blades elongate, 1.5-2 cm. wide, very scabrous on the margins; inflorescence 26 cm. long, composed of about 20 rather narrowly ascending



racemes, the lower ones as much as 14 cm. long, 1 mm. wide, rather thickish, scabrous on the margins; spikelets 3.1 cm. long, 2 mm. wide, elliptic, slightly obovate, glabrous; second glume and sterile lemma covering the fruit, reddish brown, the lateral nerves of the glume crowded at the margins; fruit reddish brown, shining, minutely striate, the lemma raised in a definite hump.

Type in the U. S. National Herbarium, No. 1501223, collected in moist spot in brushy campo, Campo Grande, Mato Grosso, Brazil, by Agnes Chase (No. 10842).

Additional material examined: Brazil: Mato Grosso: Between Bonito and Rodonopolis, Chase 11899. Goias: Goias, Chase 11846. Minas Gerais: São Miguel, Chase 10551.

39. *PASPALUM FORMOSUM* Swallen, sp. nov.

Culmi erecti, glabri, 155 cm. alti; laminae 10-25 cm. longae, 2-3 mm. latae, firmae, attenuatae, supra pubescentes, marginibus scabrae; racemi 6, adscendentes, ca. 8 cm. longi; spiculae binae, 2.6-2.7 mm. longae, 1.5-1.6 mm. latae, ellipticae, glabrae.

Perennial; culms erect, 155 cm. tall, glabrous; sheaths 10-12, completely covering the culm, slightly inflated, much broader than the blade, the uppermost to 32 cm. long with a much reduced blade; ligule 2 mm. long, decurrent; blades 10-25 cm. long, 2-3 mm. wide, firm, attenuate, pubescent on the upper surface, the margins scabrous; inflorescence 12 cm. long, composed of 6 ascending racemes about 8 cm. long; spikelets in pairs, 2.6-2.7 mm. long, 1.5-1.6 mm. wide, elliptic, the pedicels slender, scabrous, 1 mm. long; second glume and sterile lemma rather thin, glabrous, the margins of the sterile lemma raised, sometimes with a few obscure cross-wrinkles.

Type in the U. S. National Herbarium, No. 2014969, collected at Santa Terezinha, Ituiutaba, Minas Gerais, Brazil, February 18, 1951, by A. Macedo (No. 3171).

This species is unlike anything else that I have seen. The many broad sheaths, evenly spaced on the culm and completely covering it, and the relatively small blades, are characteristic.

40. *PASPALUM PALUDOSUM* Swallen, sp. nov.

Culmi erecti, graciles, 95 cm. alti; laminae usque 22 cm. longae, 6-9 mm. latae, erectae, supra marginibus papilloso-hispidae; racemi 4, graciles, patentibus, 4.5 cm. longi; spiculae binae, 2.4-2.6 mm. longae, 1.6-1.8 mm. latae, ellipticae, glabrae; fructus atrobrunneus, lucidus.

Perennial; culms erect from a knotty base, simple, slender, 95 cm. tall; sheaths crowded, much longer than the internodes, the line of demarcation between sheath



and blade not evident, the upper two shorter than the internodes, bladeless or nearly so; ligule 0.5 mm. long; blades as much as 22 cm. long, 6-9 mm. wide, erect, papillose-hispid on the upper surface on and near the margins, the margins scabrous as well; inflorescence 6 cm. long, composed of 4 slender spreading racemes about 4.5 cm. long; spikelets in pairs, 2.4-2.6 mm. long, 1.6-1.8 mm. wide, elliptic, glabrous, or the second glume pubescent, on pedicels 0.5 mm. long; sterile lemma reddish with pale raised margins, with few cross-wrinkles; fruit very dark brown, smooth and shining.

Type in the U. S. National Herbarium, No. 1613888, collected in open wet places or in woods, Carolina to San Antonio de Balsas, Maranhão, Brazil, March 20-25, 1934, by Jason R. Swallen (No. 3959).

41. *PASPALUM RAMOSUM* Swallen, sp. nov.

Culmi erecti, nodis inferioribus ramosi; laminae 8-28 cm. longae, 2-4 mm. latae, glabrae; racemi 5, erecti vel adscendentes, 4-7 cm. longi; spiculae binae, 3.2 mm. longae, 2.1 mm. latae, leviter obovatae, glabrae.

Perennial; culms erect, branching at the lower nodes, glabrous, shining; sheaths loose, all longer than the internodes, glabrous; ligule 1 mm. long, not decurrent; blades 8-28 cm. long, 2-4 mm. wide at the base, erect, entirely glabrous; inflorescence 9-11 cm. long, composed of 5 erect or ascending racemes 4-7 cm. long, with a tuft of long hairs in the axils; rachis 1 mm. wide, the margins scabrous, occasionally with a few long hairs; spikelets in pairs, 3.2 mm. long, 2.1 mm. wide, slightly obovate, on rather thick scabrous pedicels, 1 and 2 mm. long; second glume and sterile lemma glabrous or the glume sometimes very sparsely pubescent.

Type in the U. S. National Herbarium, No. 2205268, collected in sandy moist ground at the Instituto Agronomico do Sul, Pelotas, Rio Grande do Sul, Brazil, November 10, 1954, by José de Costa Sacco (No. 221).

This is one of the very few of the perennial species of the *Plicatula* group of *Paspalum* which has branching culms. It is also unique in being almost entirely glabrous. Aside from the type, it was also collected at Pelotas by Costa Sacco (No. 208).

42. *PASPALUM CRUSTARIUM* Swallen, sp. nov.

Culmi erecti, 25-35 cm. alti, glabri; laminae 6-12 cm. longae, 2.5-4 mm. latae, attenuatae, glabrae, marginibus scabrae; racemi 2 vel 3, patentés, 2-4 cm. longi; spiculae binae, 2.4-2.5 mm. longae, obovatae, glabrae; fructus atrobrunneus, lucidus, striatus, lemma valde convexum.



Annual; culms erect, 25-35 cm. tall, glabrous; sheaths all longer than the internodes, glabrous, or ciliate on the margins; blades 6-12 cm. long, 2.5-4 mm. wide, attenuate, glabrous or the lower ones pubescent, the margins scabrous; inflorescence composed of 2 or 3 spreading racemes 2-4 cm. long, the rachis 0.7 mm. wide, glabrous; spikelets in pairs, 2.4-2.5 mm. long, obovate, glabrous, the sterile lemma flat, embossed, especially around the margins, the second glume variously embossed transversely across the back; fruit dark brown, shining, striate, the lemma strongly convex.

Type in the U. S. National Herbarium, No. 1613877, collected in open woods between Carolina and San Antonio de Balsas, Maranhão, Brazil, March 20-25, 1934, by Jason R. Swallen (No. 3985).

Additional material examined: Brazil: Maranhão: Grajahú to Porto Franco, Swallen 3826; Carolina to San Antonio de Balsas, Swallen 3947, 3968, 3995, 4092, 4101. These specimens vary in size from the type, being as much as 60 cm. tall with blades to 5 mm. wide, and 5 racemes. The spikelets, however, are identical.

43. *PASPALUM PANNUCEUM* Swallen, sp. nov.

Culmi erecti, 2.3 m. alti, glabri; laminae 20-35 cm. longae, 5-7 mm. latae, ad basim attenuatae, pubescentes; racemi 4, erecti vel adscendentes, 13-16 cm. longi; spiculae atrobrunneae, 3.5 mm. longae; pedicelli breves, summo crateriformes; gluma secunda et lemma sterile grosse rugosa.

Perennial; culms erect, 2.3 m. tall, glabrous; sheaths elongate, all longer than the internodes, narrowed at the summit, the lower ones pubescent or pilose; ligule 3 mm. long, brown, protruding from the lower sheaths; blades 20-35 cm. long, 5-7 mm. wide, attenuate toward the base to the width of the sheath, pubescent on both surfaces, the upper two greatly reduced; racemes 4, erect or ascending, 13-16 cm. long, the rachis 1.5 mm. wide; spikelets dark brown, 3.5 mm. long, paired, or sometimes solitary, on short thick pedicels, the summit crateriform, 0.7-0.8 mm. wide; second glume and sterile lemma very coarsely transversely wrinkled and mottled; fruit reddish brown, striate, covered by the glume and sterile lemma.

Type in the U. S. National Herbarium, No. 1961391, collected in small banhado, Fazenda da Palma, Pelotas, Rio Grande do Sul, Brazil, April 23, 1945, by Jason R. Swallen (No. 9183).

This is the most robust species of the *Plicatula* group.

44. *PASPALUM COMPRESSIFOLIUM* Swallen, sp. nov.

Culmi erecti, compressi, 40 cm. alti; laminae 3 mm. latae, conduplicatae, glabrae, marginibus scabrae;



racemi 4-6, adscendentes, 3-5 cm. longi; spiculae binae, 2.5-2.6 mm. longae, 2 mm. latae, ellipticae, glabrae vel gluma secunda pubescens; fructus atrobrunneus, minute striatus.

Perennial; culms erect, flattened, about 40 cm. tall; sheaths crowded toward the base, 3-8 cm. long, the culm sheaths elongate, conspicuously flattened and keeled, glabrous, the basal ones as much as 8 mm. wide as folded; ligule brown, membranaceous, 1 mm. long; blades conduplicate, gradually narrowed from the base, as much as 3 mm. wide as folded, glabrous except for the scabrous margins; racemes 4-6, ascending, 3-5 cm. long, the rachis 0.8 mm. wide, long-pilose in the axils, the margins scabrous; spikelets in pairs 2.5-2.6 mm. long, 2 mm. wide, elliptic, glabrous, or the second glume more or less pubescent; pedicels short and thick, about 0.5 mm. wide at the summit; fruit dark brown, finely striate-roughened.

Type in the U. S. National Herbarium, No. 1961358, collected in wet ground, margin of banhado, Fazenda da Brigada, Passo Fundo, Rio Grande do Sul, Brazil, December 19, 1945, by Jason R. Swallen (No. 7790).

The following specimens seem to belong to this species although the sheaths are not so conspicuously equitant. Brazil: Rio Grande do Sul: Passo Fundo, Swallen 8012. Paraná: Ponta Grossa, Swallen 8318; Pereira 5200, 5252. Santa Catarina: Lajes, Reitz & Klein 13965, 14065; Caçador, Klein 3551; S. Joaquim, Reitz & Klein 7881; Santa Cecilia, Reitz & Klein 14146.

45. *PASPALUM VALIDUM* Swallen, sp. nov.

Culmi grossi, erecti, 1.5 m. alti; laminae usque 50 cm. longae, 1-1.5 cm. latae, prope margines pilosae vel hispidae; racemi 18, adscendentes vel patentés, infimus ca. 9 cm. longus; spiculae binae, 2.5-2.7 mm. longae, 1.5 mm. latae, pedicellis scabris usque 1.5 mm. longis; gluma secunda sparse pilosa, fructu paulo brevior; fructus fuscus, lucidus.

Culms coarse, erect, 1.5 m. tall; sheaths broad, very loose, compressed, keeled, the lower ones 3-12 cm. long, glabrous or sparsely pubescent; ligule 0.5-1 mm. long, entire, the junction with the sheath and blade well marked; blades as much as 50 cm. long, 1-1.5 cm. wide, usually pilose near the margins, or sometimes sparsely hispid; inflorescence 22 cm. long, pyramidal, composed of 18 ascending or spreading racemes, the lowermost about 9 cm. long; rachis 0.7-0.8 mm. wide, scabrous on the margins; spikelets in pairs, 2.5-2.7 mm. long, 1.5 mm. wide, on slender, very scabrous pedicels, as much as 1.5 mm. long; second glume sparsely pilose, a little shorter than the fruit, the sterile lemma glabrous, equaling the fruit; fruit dark reddish brown, shining.



Type in the U. S. National Herbarium, No. 1613226, collected at base of rocky slope, in chapada, between Grajahú and Porto Franco, Maranhão, Brazil, March 8-13, 1934, by Jason R. Swallen (No. 3784).

46. PASPALUM VIALE Swallen, sp. nov.

Culmi erecti, 55-80 cm. alti, glabri; laminae ca. 20 cm. longae, 2-4 mm. latae, acuminatae, pilosae; racemi 3-5, adscendentes, inferiores 10 cm. longi; spiculae 2.8-2.9 mm. longae, 1.8 mm. latae, ellipticae; gluma secunda et lemma sterile atroferruginea, lucida, glabra.

Perennial; culms tufted, erect, glabrous, 55-80 cm. tall; sheaths all longer than the internodes, densely pilose with spreading hairs as much as 5 mm. long; ligule 3-4 mm. long; blades about 20 cm. long, 2-4 mm. wide, gradually narrowed to the base, acuminate, pilose like the sheaths; inflorescence partly enclosed in the elongate upper sheath, composed of 3-5 ascending racemes, the lower ones 10 cm. long, the rachis 1 mm. wide, scabrous on the margins; spikelets 2.8-2.9 mm. long, 1.8 mm. wide, elliptic on scabrous pedicels 0.5-1 mm. long; second glume and sterile lemma dark reddish brown, both rather prominently cross-wrinkled, shining, glabrous; fruit dark brown, smooth and shining, the back of the lemma evenly raised.

Type in the U. S. National Herbarium, No. 1916368, collected along roadside, Campo Largo, near Curitiba, Paraná, Brazil, February 15, 1946, by Jason R. Swallen (No. 8591).

This species is definitely related to Paspalum pannuceum Swallen, which differs in being nearly glabrous and in having larger spikelets. Both species have the evenly spaced nerves on the second glume, and the fruit evenly curved on the back.

47. PASPALUM OTEROII Swallen, sp. nov.

Culmi decumbentes, patentes, nodis radicanter, glabri, usque 1.5 m. longi; laminae 6-15 cm. longae, 3-5 mm. latae, acuminatae, marginis scabrosae; racemi 4 vel 5, adscendentes vel appressi; spiculae binae, ellipticae, dense pubescentes; fructus 2.8 mm. longus, atrobrunneus, lucidus.

Perennial; culms decumbent-spreading, stolon-like, rooting at the nodes, glabrous, as much as 1.5 m. long; internodes of nearly equal length, 6-10 cm. long, the sheaths 1/2-1/3 as long; blades 6-15 cm. long, 3-5 mm. wide, acuminate, nearly glabrous, or more or less papillose-pilose toward the base, the white margins very scabrous; racemes 4 or 5, ascending or appressed, the rachis 1 mm. wide; spikelets in pairs, elliptic, 3 mm. long, very densely pubescent; fruit 2.8 mm. long, dark brown, shining.



Type in the U. S. National Herbarium, No. 1982726, collected at the Seccão Experimental de Agrostologia, Rio de Janeiro, Brazil, by Jorge Ramas de Otero, February 15, 1950. Grown from seed from the Pantanal, Mato Grosso, where it is considered to be a good forage grass. It is easily propagated by cuttings.

### Anachyris

#### 48. PASPALUM PLANIUSCULUM Swallen, sp. nov.

Culmi erecti, 160 cm. alti, compressi, pilosi, nodis dense villosis; laminae usque 65 cm. longae, 1.5 mm. latae, infra pilosae, supra glabrae, marginibus scabrae et hispidae, superiores 15 cm. longae, 2 cm. latae; racemi ca. 40, adscendentes vel patentibus, infimus usque 6-7 cm. longus; spiculae 1.6 mm. longae, 0.8 mm. latae, glabrae; fructus albus.

Perennial; culms erect, 160 cm. tall, conspicuously flattened, apparently soft and spongy, appressed to spreading pilose, the nodes densely villous with ascending hairs; sheaths much longer than the internodes, compressed, keeled, as much as 38 cm. long, appressed-pilose or the uppermost nearly glabrous; blades as much as 65 cm. long, 1.5 mm. wide, about half the length narrowed, petiole-like, pilose beneath, glabrous above, scabrous and hispid on the margins, the upper ones about 15 cm. long, 2 cm. wide, with a dense tuft of hairs just above the ligule; inflorescence 30 cm. long, composed of about 40 ascending or spreading racemes, the lowest as much as 6-7 cm. long, the rachis 0.7-1 mm. wide, scabrous on the margins; spikelets 1.6 mm. long, 0.8 mm. wide, glabrous, the fruit white.

Type in the U. S. National Herbarium, No. 1613026, collected in brushy border of forest between Grajahú and Porto Franco, Maranhão, Brazil, March 8-13, 1934, by Jason R. Swallen (No. 3841). This species is characterized by the conspicuously flattened culms, and the elongate sheaths and basal portion of the blades.

#### 49. PASPALUM TENUIFOLIUM Swallen, sp. nov.

Culmi erecti nodis inferioribus ramosi, 1.5 m. alti, nodis dense villosis; laminae tenues, 9-40 cm. longae, 1.5-3 cm. latae, infra pubescentes, marginibus scabrae; racemi 45, adscendentes, infimus 9 cm. longus; spiculae 1.6-1.7 mm. longae, 0.8-1 mm. latae, pedicellis gracilibus 0.5-1 mm. longis.

Annual; culms erect, branching at the lower nodes, 1.5 m. tall, the nodes densely villous; sheaths about as long as the internodes, papillose-pilose with spreading hairs; blades thin, 9-40 cm. long, 1.5-3 cm. wide, the lower narrowed to the base, pubescent on the under surface, glabrous above, the margins very scabrous, with a dense tuft of long hairs above the ligule;



inflorescence about 22 cm. long, composed of nearly 45 ascending racemes, the lower 9 cm. long, the rachis 1 mm. wide, the margins scabrous; spikelets 1.6-1.7 mm. long, 0.8-1 mm. wide, on slender pedicels 0.5-1 mm. long.

Type in the U. S. National Herbarium, No. 1612692, collected on wet banks along ditch, Caxias to Barra do Corda, Maranhão, Brazil, February 18-26, 1934, by Jason R. Swallen (No. 3602). This species also was collected between Barra do Corda and Grajahú, Maranhão, Swallen (No. 3766), and between Carolina and San Antonio de Balsas, Maranhão, Swallen (No. 4017).

50. PASPALUM COSTELLATUM Swallen, sp. nov.

Culmi gracillimi, 12-28 cm. alti, erecti, glabri, nodis inferioribus ramosi; laminae usque 6 cm. longae, 4-8 mm. latae, hispido-ciliatae, infra et supra hirsutae; racemi 3-6, patentés usque 2.5 cm. longi; spiculae solitariae, interdum binae, 1.3 mm. longae, glabrae.

Annual; culms very slender, erect, glabrous, branching at the lower nodes, 12-28 cm. tall; sheaths mostly shorter than the internodes, keeled, glabrous or nearly so; blades as much as 6 cm. long, 4-8 mm. wide, hispid-ciliate, appressed-hirsute on both surfaces; racemes 3-6, spreading, up to 2.5 cm. long, the rachis 1-1.3 mm. wide, scabrous on the margins; spikelets mostly solitary, sometimes in pairs, 1.3 mm. long, glabrous; fruit white.

Type in the U. S. National Herbarium, No. 1613883, collected in chapada, Carolina to San Antonio de Balsas, Maranhão, Brazil, March 20-25, 1934, by Jason R. Swallen (No. 3955). This species was collected in 1962 by Eiten & Eiten, in chapada near "Grota Grande," trail to Santa Bárbara, Município de Loreto, Maranhão.

51. PASPALUM EITENII Swallen, sp. nov.

Culmi graciles, erecti vel adscendentes, 55-100 cm. alti, glabri, straminei; laminae elliptico-lanceolatae, 4-16 cm. longae, 6-15 mm. latae, basi longipilosae; racemi 7-13, patentés, infimus usque 6 cm. longus; spiculae 1.4-1.6 mm. longae, 0.7-0.8 mm. latae, glabrae; fructus albus vel stramineus; lemma fertile valde 5-nerve.

Annual; culms slender, erect or ascending, 55-100 cm. tall, soft, glabrous, straw-colored, shining; sheaths all shorter than the internodes, glabrous, the uppermost elongate; blades elliptic-lanceolate, 4-16 cm. long, 6-15 mm. wide, acute, gradually narrowed to the base, with long dense hairs just above the ligule, the margins scabrous, otherwise glabrous; inflorescence 9-12 cm. long, composed of 7-13 spreading racemes, the lower up to 6 cm. long, the rachis 0.7 mm. wide, glabrous on the back, the margins scabrous; spikelets 1.4-



1.6 mm. long, 0.7-0.8 mm. wide, glabrous, the pedicels about 0.5 mm. long; fruit white or light yellow, the lemma strongly 5-nerved.

Type in the U. S. National Herbarium, No. 2434291, collected in ravine of dry brook in extensive "caatinga" forest, between Rios Balsas and Parnaíba, "Ilha de Balsas" region, Município de Loreto, Maranhão, Brazil, April 6, 1962, by George Eiten and Liene T. Eiten (No. 4091).

This species was also collected in the same region by Eiten & Eiten (Nos. 3901, 3988, 4078, 4089, and 4273).

Additional material examined: Brazil: Maranhão: Serra da Malícia, near Carolina, Pires & Black 2293; Barra do Corda to Grajahú, Swallen 3766, 3770; Carolina to San Antonio de Balsas, Swallen 3955; Piauí: Swallen 4207; Ceará: Crato to Barbalha, Swallen 4374; Baturité to Guaramirango, Swallen 4428.

These specimens have been referred to Paspalum malacophyllum Trin., which is a perennial species, much different from P. eitenii.

#### Ungrouped

#### 52. PASPALUM CLANDESTINUM Swallen, sp. nov.

Culmi erecti vel adscendentes, 13-28 cm. alti, glabri; laminae 3-7 cm. longae, 4-7 mm. latae, dense pilosae pilis 2 mm. longis; racemus solitarius, tectus, 10 cm. longus; rhachis 1 mm. lata, marginibus scabra; spiculae solitariae 3 mm. longae, 1.5 mm. latae, ovatae, acutae; gluma secunda et lemma sterile maculata, 3-nervia, villosa; fructus 2.5 mm. longus, plano-convexus, ellipticus, pallidus, minute striatus.

Annual; culms erect or ascending, 13-28 cm. tall, glabrous; sheaths all longer than the internodes, glabrous on the back, sparsely to densely pilose on the margins and toward the summit; blades 3-7 cm. long, 4-7 mm. wide, erect or ascending, rather firm, densely pilose with white hairs about 2 mm. long; raceme solitary, almost entirely enclosed in the sheath, about 10 cm. long, slightly arcuate, the rachis about 1 mm. wide, minutely scabrous on the margins; spikelets solitary, 3 mm. long, 1.5 mm. wide, ovate, acute, the first glume 0.5 mm. long, thickened, the second glume and sterile lemma aduate to it; second glume and sterile lemma spotted, equal, 3-nerved, the lateral nerves marginal, lightly covered with white silky hairs; fruit 2.5 mm. long, plano-convex, broadly elliptic, pale, minutely striate.

Type in the U. S. National Herbarium, No. 1613861, collected in low chapada between Carolina and San Antonio de Balsas, Maranhão, Brazil, March 20-25, 1934, by Jason R. Swallen (No. 4064).

The raceme may be exerted later, but the spikelets do look mature.



53. PASPALUM SCHULTESII Swallen, sp. nov.

Culmi dense caespitosi, erecti, 16-35 cm. alti, glabri; laminae involutae, usque 25 cm. longae, supra dense scabro-pubescentes, infra scabrae; racemi 2, conjugati, adscendentes vel appressi, 1.5-3 cm. longi; spiculae obovatae, acutae, brunneae; pedicelli compressi, ciliati, 1 mm. longi; gluma secunda et lemma sterile tenuissima, nervis inconspicuis; fructus obovatus, atrobrunneus, lucidus.

Perennial; culms very densely tufted, erect, 16-35 cm. tall, glabrous; sheaths variously pilose especially at the summit and toward the base, the hair golden, appressed; ligule 0.5 mm. long, decurrent; blades involute, as much as 25 cm. long, usually much shorter, densely scabrous, pubescent on the inner surface, glabrous on the outer, sometimes curved or flexuous; racemes 2, conjugate, ascending or appressed, 1.5-3 cm. long, the rachis glabrous, even on the margins; spikelets ovate, acute, brown, on flattened, ciliate pedicels 1 mm. long; second glume and sterile lemma very fragile, the midnerve suppressed, the marginal nerves faint; fruit obovate, dark brown, smooth and shining.

Type in the U. S. National Herbarium, No. 2150293, collected near the Rio Paraná Pichuna (tributary of Rio Vaupés), Vaupés, Colombia, June 1953, by Richard Evans Schultes and Isidoro Cabrera (No. 19934).

This species does not belong to any group of Paspalum known. It is characterized by the involute blades and two conjugate racemes of brown spikelets.

54. PASPALUM FROESIANUM Swallen, sp. nov.

Culmi grossi, erecti, ca. 1 m. alti; laminae planae, 30-40 cm. longae, 8-12 mm. latae, acuminatae, dense pilosae, vetae crispescentes; racemi 12, appressi, inferiores remoti, 9 cm. longi; spiculae 2.6-2.7 mm. longae, ellipticae, pedicellis 3-4 mm. longis; gluma prima evidens, ciliata; gluma secunda spicula paulo brevior, appresso-pilosa; sterile lemma spiculam aequans, appresso-pilosum; fructus pallidus.

Perennial; culms rather coarse, erect, more than 1 m. tall; sheaths longer than the internodes, hispid or papillose-hispid with long appressed hairs, becoming shorter on the uppermost nearly bladeless sheaths; ligule a brown membranaceous rim 0.1 mm. long; blades flat, 30-40 cm. long, 8-12 mm. wide, acuminate, densely pilose on both surfaces, the margins papillose-hispid-ciliate, the older ones becoming more or less curled at the base of the culms; panicle 23 cm. long, composed of 12 closely appressed racemes, the lower distant, 9 cm. long, becoming shorter and more crowded toward the tip; spikelets 2.6-2.7 mm. long, elliptic, on pedicels 3-4 mm. long; first glume evident, ciliate; second glume a



little shorter and narrower than the fruit, appressed-pilose; sterile lemma as long as the fruit, appressed-pilose especially on the margins; fruit pale.

Type in the U. S. National Herbarium, No. 2205975, collected on the Macapá-Clevelandia road, km. 120, Territorio do Amapá, Brazil, July 22, 1951, by G. A. Black and R. L. Fróes (No. 51-12357).

55. *PASPALUM TELMATUS* Swallen, sp. nov.

Culmi dense caespitosi, erecti, 50-60 cm. alti, glabri; laminae firmae, erectae, acuminatae, 20-30 cm. longae, 3-6 mm. latae, dense appresso-pilosae; racemi 5-7, rigide adscendentes, 3-5 cm. longi; spiculae 3 mm. longae, 1.3-1.5 mm. latae, acutae; gluma secunda et lemma sterile tenuia, glabra, fructu 0.5 mm. longiora; fructus 2.5 mm. longus, pallidus, obovatus.

Perennial; culms in dense tufts, erect, 50-60 cm. tall, glabrous; ligule a very short glabrous rim; sheaths mostly crowded toward the base, of nearly equal length, compressed, keeled, densely appressed-pilose; blades firm, strictly erect, acuminate-pointed, 20-30 cm. long, 3-6 mm. wide, densely appressed-pilose; inflorescence 6-8 cm. long, composed of 5-7 stiffly ascending racemes, 3-5 cm. long, with a few hairs in the axils, the rachis 0.7 mm. long; spikelets 3 mm. long, 1.3-1.5 mm. wide, acutish, on slender glabrous pedicels 0.5-1 mm. long; second glume and sterile lemma thin, glabrous, pointed beyond the fruit 0.5 mm., the glume with the lateral nerves very close together; fruit 2.5 mm. long, pale, slightly obovate, rounded.

Type in the U. S. National Herbarium, No. 1500550, collected on wet sandy margin of lake, Logoinhes, between Campo Grande and Dourados, Mato Grosso, Brazil, by Agnes Chase (No. 10926).

56. *PASPALUM REDONDENSE* Swallen, sp. nov.

Culmi erecti, 55-60 cm. alti, glabri, rhizomatibus curtis; laminae firmae, planae, erectae, 6-10 cm. longae, 1.5-2.5 mm. latae, sparse papillosae vel papilloso-pilosae pilis 2-3 mm. longis; racemi 4-6, adscendentes, inferiores usque 7 cm. longi; spiculae 2.8 mm. longae, 1.4 mm. latae; gluma secunda et lemma sterile tenuia, 3-5-nervia, glabra; fructus pallidus, lucidus, minute striatus.

Perennial; culms erect from a short rhizome-like base, 55-60 cm. tall, glabrous; sheaths shorter than the internodes, the lowermost appressed-pilose at the base, the rest glabrous or with a few appressed hairs on the margins; blades firm, flat, erect, 6-10 cm. long, 1.5-2.5 mm. wide, with a few widely spaced large papillae, or papillose-ciliate, the hairs spreading, 2-3 mm. long; inflorescence 5-7 cm. long, composed of 4-6 ascending racemes, the lower as much as 7 cm. long,



long-pilose in the axils; spikelets 2.8 mm. long, 1.4 mm. wide, the second glume and sterile lemma rather thin, 3-5-nerved, glabrous; fruit pale, smooth and shining, minutely striate.

Type in the U. S. National Herbarium, No. 1961595, collected in shallow soil on rock outcrops, Fazenda Capão Redondo, Guarapuava, Paraná, Brazil, March 20-23, 1946, by Jason R. Swallen (No. 8837). Swallen 8844, collected at the same locality, belongs to this species.

57. PASPALUM MORULUM Swallen, sp. nov.

Culmi erecti, 35-60 cm. alti, glabri; laminae 15-20 cm. longae, 2-5 mm. latae, acuminatae, papilloso-pilosae; racemi 2-4, adscendentes, 1-3 cm. longi; spiculae binae, 2.4 mm. longae, 1.8 mm. latae, plano-convexae, 1.5 mm. crassae, fructus pallidus, lucidus.

Annual; culms erect, 35-60 cm. tall, glabrous; sheaths longer than the internodes, papillose-pilose with spreading hairs 5-7 mm. long; ligule truncate, short, glabrous; blades 15-20 cm. long, 2-5 mm. wide, papillose-pilose like the sheaths, becoming glabrous toward the acuminate tip; inflorescence 2-6 cm. long, composed of 2-4 spreading racemes 1-3 cm. long, with a few long hairs on the margins of the rachis and in the axils; spikelets in pairs, 2.4 mm. long, 1.8 mm. wide, plano-convex, 1.5 mm. thick, slightly obovate, rounded, mottled, light-colored, finally turning to a deep brown or black; fruit the same size and shape as the spikelet, pale, smooth and shining.

Type in the U. S. National Herbarium, No. 2434293, collected along open dry rocky trail through low "chapada" from Loreto to Fazenda Aldeia, Maranhão, Brazil, April 11, 1962, by George Eiten & Liene T. Eiten (No. 4250).

58. PASPALUM SWALLENII Chase, sp. nov.

A P. morulo Swallen, racemis brevioribus et spiculis brevioribus 1.5-1.6 mm. longis differt.

Similar in all respects to P. morulum Swallen, except for the shorter racemes and smaller spikelets, the latter 1.5-1.6 mm. long.

Type in the U. S. National Herbarium, No. 2238406, collected in red sandy loam in chapada between Carolina and San Antonio de Balsas, Maranhão, Brazil, March 20-25, 1934, by Jason R. Swallen (No. 4100).

This specimen was indicated by Mrs. Chase as a new species many years ago, but no description was ever written.